Frequency analysis of vocalisations in relation to the growth in broiler chicken

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Abstract

Poultry is one of the lowest cost sources of animal protein in the world and, more than 40 billion chickens are produced every year globally. For reasons of public concern and due to the large number of animals involved, it is considered by many people to be important to take care of the welfare and health status of the chickens reared under intensive farm conditions. Precision Livestock Farming (PLF) can support the farmer in his day to day routine management through the use of sensors, cameras and microphones, and these have the potential to improve production and to enable monitoring of welfare status. In this context, the 7FP EU-PLF project aims to test the efficiency of the use of those sensors at farm level. In particular, the aim of this study was to record and analyse broiler vocalisations under normal farm conditions and to identify the relation between animal sounds, and growth trends. Recordings were made at regular intervals, for the entire short production life of the birds, in order to evaluate the variation of frequency and bandwidth of the sounds emitted by the animals during the cycle of production. The recordings were made in an automated, non-invasive and non-intrusive way and the sound data was compared with the weight of the birds automatically measured by a 'step on scale' placed on the floor of the broiler house. Sound analysis was performed based on the amplitude and frequency of the sound signal in audio files recorded at farm level. Through analysis of the sounds recorded, a significant correlation ($P<0.001$) between the frequencies of the vocalisations recorded and the weight of the broilers was found across all production cycles and farms assessed. The ongoing goal will be the development of a tool able to automatically detect the growth of the animals based on the frequency of the vocalisation emitted by the birds at different ages, and as a possible tool for determining deviations from their expected growth trend.